

should segment if kept for a sufficiently long period, and, further, that it ought to be possible to induce segmentation by heat, since heat is known to accelerate chemical reactions, but neither of these results could be obtained. Loeb has suggested, therefore, that the spermatozoon, in conjugating with the ovum, may very possibly remove from the latter a negative catalyser or condition, the presence of which in the ovum somehow inhibits the process of development. Strangely enough, the present work contains no account of Loeb's conclusions in regard to this matter.

Delage's recent paper (1907) is referred to in a couple of lines, but there is no mention of the fact that his latest method of artificially fertilising sea-urchins' eggs differs radically from those employed by Loeb, and consequently there is no reference to the very important conclusions which Delage deduces from his results. Moreover, we should have expected an allusion to the fact that the symmetry of the sea-urchins which Delage succeeded in rearing was hexamerous instead of pentamerous, an observation which seems to us to have an important bearing on recent Mendelian research and teaching. Furthermore, the statement on another page that Delage has described half the ordinary number of chromosomes for parthenogenetic echinoderms is misleading, since this author says distinctly that in such cases the normal number becomes restored by a process of "auto-regulation."

The account given of fertilisation is followed by interesting chapters on egg-structure, mitotic cell division, gastrulation, the mechanism of the development of differentiation, and the influence of external factors. We have no space left in which to criticise these. Although we have not refrained from pointing out certain shortcomings, this does not prevent us from congratulating both author and translator on the production of what is, on the whole, a very useful summary of embryogenetic research.

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#### MODERN PHARMACOGNOSY.

*Handbuch der Pharmakognosie.* By Prof. A. Tschirch. Parts ii. to viii. (Leipzig: Chr. Herm. Tauchnitz, 1908.) Price 2 marks per part.

THE general scheme of this important work on pharmacognosy having been described in a previous issue of NATURE (vol. lxxviii., p. 629, October 22, 1908), the manner in which the scheme is being carried out may now be examined.

The bulk of the first four parts, in all about 116 pages, is devoted to "pharmacoergasy," that is, the cultivation, collection, and preparation of drugs. Numerous instances, perhaps not very systematically arranged, of the cultivation of drugs in remote ages are cited, and accounts are given of modern attempts to acclimatise important medicinal plants. The great problem of pharmacoergasy is, according to the author, the determination, not only of the conditions of growth simply, but also of those conditions that most conduce to the formation of valuable constituents, a

problem which presents a boundless field for investigation. The irrationality of a number of the processes at present in use for drying drugs is indicated, and suggestions made for their improvement.

The times at which leaves and other organs should be collected are stated in general terms, but doubt may well be expressed whether these are not in several, perhaps many, instances incorrect; at least they have not been sufficiently substantiated either by chemical or biochemical assay. To allude to definite instances, it has recently been well established by the physiological experiments of Dixon supporting the assays of Fromme that the first year's leaves of the foxglove are practically of equal value with the second year's, although Prof. Tschirch would reject them as worthless. Chemical assay has also demonstrated the practical equality of the first and second year's henbane leaves, and probably also those of the annual plant were the leaves only of the latter collected and properly dried. Even the best period for the collection of aconite and belladonna cannot yet be regarded as firmly established. Schroff may well have been the first to indicate the time at which hemlock fruits should be gathered, but the admirable researches of Farr and Wright determined the point definitely by analysis.

In this section enzymes and their influence are considered, though perhaps more emphasis might be laid on their prejudicial action, and on the means now generally advocated and adopted for obviating it. A most comprehensive list of the plants cultivated in Europe and the United States is included in this part of the work, as well as a chapter on the collection of drugs, well illustrated by a number of photographs. The preparation of drugs is discussed at some length, and consists practically of well-known processes which are commonly given under each drug, but are here collected together.

Part iv. deals with "pharmacoemporia," or the commerce in drugs, a section of pharmacognosy which has until lately been only too much neglected, though of the greatest interest. Here the various routes that commerce between the East and the West has taken from ancient to modern times are briefly, though not too lucidly, traced and explained by three maps. Excellent accounts are given of the drug sales in London, Hamburg, and Amsterdam, those in London being accompanied by several illustrations identical with those first published in the *Pharmaceutical Journal* by Mr. Heap, an acknowledgment for which has doubtless escaped the author. Photographs of the most important harbours of the world illustrate this section of the work.

The commercial varieties of drugs and the packages in which they are exported form the chief subject of part v. In part vi. the advantages and disadvantages of the various pharmacognostical systems of classification that have from time to time been proposed are fully discussed, the author being in favour of one based upon the chemical relationships of the chief constituents, though he admits that such a system is at present impracticable, as the constitution of so few of the constituents is sufficiently well known. For all teachers of pharmacognosy the

chapter on instruction in the science will probably possess the greatest interest; it certainly deserves to be most carefully studied, as it is replete with stimulating suggestions. Most welcome will also be the abundant literary references, constituting the first bibliography of pharmacognosy.

Pharmacozoology is very briefly dealt with, and stands in sharp contrast with the rest of the work. Considering the success that has attended the development in recent years of organotherapy, it is difficult to understand why such widely used parts of animals as the thyroid gland, suprarenal capsule, &c., and such products of animals as pepsin, pancreatin, wool fat, &c., have been excluded from the animal drugs enumerated by the author.

All the parts of the handbook that have appeared are most profusely illustrated, and Prof. Tschirch must be congratulated on the excellence of his work.

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#### SCIENCE IN THE TEXTILE INDUSTRIES.

*The Structure of the Wool Fibre and its Relation to the Use of Wool for Technical Purposes.* By Dr. F. H. Bowman. Pp. xx+475; with many coloured and other illustrations. (London: Macmillan and Co., Ltd., 1908.) Price 8s. 6d. net.

THIS is a companion volume to the one on "The Structure of the Cotton Fibre," which was reviewed in these columns in July, 1908, and is to be followed by a third volume dealing with the silk fibre. The subject-matter is treated in a very thorough manner, commencing with a description of the structure of the skin and the genesis of the hair or wool fibre which clearly indicates the mode of its subsequent development. The physical structure of the fibre determines its behaviour during the various mechanical processes of spinning and weaving; and this important point is well brought out in the valuable and interesting portion of the book devoted to it.

Thirty-two distinct varieties of sheep are described, of which four are inhabitants of Europe, fifteen of Asia, eleven of Africa, and two of America; but there appear to be at least thirty-one subvarieties of the common sheep (*Ovis aries*), some of which differ to a greater extent than certain sheep which are regarded as distinct varieties. It is considered probable that all varieties were originally derived from two—the long- and the short-tailed sheep—both of which in the wild state grow an outer covering of hair and a softer, finer inner covering of wool, the latter increasing and the former being gradually eliminated by domestication.

The domestic sheep was first produced in Asia, and spread thence to Europe with advancing civilisation, its introduction into Greece being probably enshrined in the legend of the golden fleece.

The scientific breeding of sheep was first systematically carried out in England, but is now practised in all the important sheep-rearing countries. In this connection it is interesting to note the effect of the frozen-meat trade on the production of wool. Before

the introduction of cold-storage transit, the carcase of the sheep at the Antipodes was of much less value than it is to-day. Sheep farmers therefore confined their attention to breeding for wool, but now have to pay more regard to the production of good mutton, the fleece being relatively less important.

In dealing with the question of sheep-dips, which are necessary on account of the parasites which infect all animals with a hairy or woolly covering, the author very properly condemns all compositions containing tar, or lime and sulphur, and advocates arsenical dips. The important question of the preparation of wool for the market receives, as it deserves, full attention, and the recommendations of the Wool Trade Committee of the Bradford Chamber of Commerce are given in full. Briefly, the trouble is caused by the presence of vegetable matter in wool, which may arise from want of care in packing or lack of cleanliness in the shearing house. The importance of this matter arises from the fact that the vegetable matter may accompany wool fibre throughout the whole of the manufacturing operations, and, on account of its very differing dyeing properties, may greatly detract from the appearance of the finished material even when present in very small amount.

The investigation of the mechanical structure of the wool fibre is traced back by the author to 1664, in which year a Dr. Hook read a paper before the Royal Society on the structure of various hairs, but, of course, the power of his microscope was very limited. About 1690 Leeuwenhoek published several illustrations of the microscopical structure of wool, and in 1742 H. Baker also read a paper on the subject before the Royal Society; but a Mr. Youatt, in 1835, using a compound microscope with a magnification of 300 diameters, claimed to have been the first to discover the true nature of the surface of the wool fibre.

The author of the present volume was, however, the first to make a systematic and comparative study of the microscopic structure of wools of various origin and at various stages of growth, and his illustrations, which are reproduced in the book, have for many years been considered as standards, and have been reproduced in most text-books dealing with wool manufacture or dyeing.

The description of the chemical nature and properties of wool is not so exhaustive or quite as satisfactory as that portion of the book dealing with the mechanical structure, but the chapter on the strength and testing of worsted yarns is excellent, and emphasises the importance of spinners and manufacturers making full use of such scientific aids as are now available.

The chapter on the theory of dyeing and colour is the least satisfactory in the book, and the excellent coloured diagrams represent the only feature which warrants inclusion.

The book is one of considerable importance, and will doubtless take the position of a standard work in the libraries of all connected with the textile industries.

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